Alcatel-Lucent 7750 Service Router

ALCATEL-LUCENT HIGH-SCALE MEDIA DEPENDENT ADAPTER

The Alcatel-Lucent 7750 Service Router (SR) with High-Scale Media Dependent Adapter (HS-MDA) extends the service-rich capabilities of the industry-leading 7750 SR by enhancing the scale, density and granularity of service queues. Intended for very large-scale deployments of legacy and emerging residential, business and mobile services, the HS-MDA optimizes the 7750 SR performance for delivering packet services engineered with high statistical gain at the unified IP/MPLS and Carrier Ethernet service edge.

The 7750 SR supports the HS-MDA as a hot-swappable, half-slot module with 10 ports for Gigabit Ethernet (GigE). Each port is compatible with optical GigE Small Form Factor Pluggable (SFP) transceivers (see Table 1).

Features

- Supports 160,000 ingress queues and 160,000 egress queues on each 7750 SR HS-MDA, providing each of 20,000 subscribers with eight queues and eight separate scheduling classes
- Uses a port-based scheduler, with eight strict priority schedulers, for each HS-MDA egress port:
  - ¬ Allows configuring each strict scheduler per egress port with a shaping rate, limiting the amount of bandwidth allowed for that level
  - ¬ Supports weighted servicing for selected scheduling classes by using two weighted groups, allowing flexible usage
- Supports 64 egress secondary shapers, providing a control mechanism to prevent downstream overruns at specific access nodes:
  - ¬ Locates each shaper before the egress port scheduler in the data path, ensuring that when a particular destination's configured peak information rate (PIR) is exceeded, all queues for that destination will stop. This is done for each queue group that has a per-subscriber context.
- Offers an onboard, robust, flexible and deep buffer-pool hierarchy:
  - ¬ Provides one million ingress and one million egress buffers for packet processing
  - ¬ Uses two random early detection (RED) slopes on each queue for very granular buffer-pool management
  - ¬ Offers three levels of on-board flexible buffer hierarchy: port-class buffer pools, class pools and root pools

- Supports byte fairness to ensure bandwidth is scheduled equally between flows of same-priority traffic with wide variations in packet size
- Delivers an expanded set of counters for each subscriber context, totaling 16 sets with each counter set, tracking stats such as:
  - ¬ Discarded low-priority packets and octets
  - ¬ Discarded high-priority packets and octets
  - ¬ Forwarded low-priority packets and octets
  - ¬ Forwarded high-priority packets and octets
- Provides additional capabilities for managing congestion through egress 802.1p bit re-marking, based on the committed information rate (CIR) state
- Supports ingress queue (color-aware) policing where a CIR leaky-bucket is configured with a threshold:
  - ¬ Discards all packets that exceed this CIR threshold
  - ¬ Offers an alternative to using PIR shaping with maximum burst size (MBS) where eliminating jitter is important
- Supports a CIR bypass-mode when using ingress queue policing, allowing packets with trusted markings to ignore the CIR processing. PIR processing will still be enforced:
  - ¬ Forwards packets with un-trusted markings with the usual CIR and PIR processing enforcements
  - ¬ Ensures that trusted packets enjoy preferential treatment when CIR is a factor

Benefits

The HS-MDA is ideal for large-scale service deployments requiring high scale, high density and fine granularity of queues. The benefits of enhancing the 7750 SR with the HS-MDA include:

- Delivers high queuing densities, the equivalent of 19.2 million queues per rack, reducing demand on scarce and costly facility space within central offices (COs)
- Allows multiple HS-MDAs to be flexibly deployed as and where required, creating an on-demand and service-rich operating environment fully interoperable with other MDA-types
- Ensures end users enjoy the highest quality of experience (QoE) by being fully integrated with the depth and breadth of all service-rich 7750 SR capabilities
- Offers service providers a Broadband Remote Access Server (BRAS) replacement plan that, combined with other 7750 SR features and functions, leverages investment in a strategic next-generation IP/MPLS and Carrier Ethernet service edge to consolidate legacy high-speed Internet (HSI) services and subscriber authentication
- Provides service providers with the scale, density and queuing granularity to embrace emerging service requirements for mass-market residential, business and mobile offerings, including those delivered in conjunction with the Alcatel-Lucent Application Assurance Integrated Service Adapter (AA-ISA) for application-based policy

Table 1. SFPs available for the HS-MDA

PART NUMBER	INTERFACE TYPE	SUBTYPE	CONNECTOR	FIBER TYPE	WAVELENGTH	POWER	RANGE
3HE00028AA	GigE SFP	LX	SFP-LC	Single mode	1310 nm	11 dB	10 km
3HE00027AA	GigE SFP	SX	SFP-LC	Multimode	850 nm	7.5 dB	550 m
3HE00867AA	GigE SFP	EX	SFP-LC	Single mode	1310 nm	18 dB	40 km
3HE00029AA	GigE SFP	ZX	SFP-LC	Single mode	1550 nm	24 dB	70 km

Technical specifications

Physical dimensions

- Height: 13 mm (0.5 in)
- Width: 171 mm (6.7 in)
- Depth: 178 mm (7.0 in)
- Weight: 0.45 kg (1.0 lb)

Environmental specifications

- Operating temperature: 0°C to 40°C (32°F to 104°F)
- Relative humidity: 15% to 85% (non-condensing)
- Operating altitude: 3048 m (10,000 ft)

Network/element management

- Fully supported by Alcatel-Lucent 5620 Service Aware Manager (SAM)
- Command line interface (CLI)

Indicators

- Operational: Solid green
- Fault: Amber

Minimum operating system (OS) software

- 7750 SR OS, Release 6.1

Optical Digital Diagnostic Monitoring (DDM) architecture compliance

- SFF-8472

Safety

- EN 60950-1
- IEC 60950-1 CB Scheme
- CSA/UL 60950-1 NRTL
- FDA CDRH 21-CFR 1040
- EN 60825-1
- EN 60825-2
- IEC 60825-1
- IEC 60825-2

Electromagnetic compatibility (EMC)

- ICES-003 Class A
- FCC Part 15 Class A
- EN 300 386
- EN 55022
- EN 55024
- EN 61000-4-2
- EN 61000-4-3
- EN 61000-4-4
- EN 61000-4-5
- EN 61000-4-6
- EN 61000-4-11
- IEC CISPR 22
- AS/NZS CISPR 22

Immunity

- EN 61000-3-2 Power Line Harmonics
- EN 61000-3-3 Voltage Fluctuations and Flicker
- EN 61000-4-2 ESD
- EN 61000-4-3 Radiated Immunity
- EN 61000-4-4 EFT
- EN 61000-4-5 Surge
- EN 61000-4-6 Low Frequency Common Immunity
- EN 61000-4-11 Voltage Dips and Sags

Telecom

- Telcordia GR-253-CORE Issue 3
- IEEE 802.3 (GigE, Ethernet)
- ANSI T1.105
- ANSI T1.105.03
- ANSI T1.105.06
- ANSI T1.105.09
- ANSI T1.403 (DS1)
- ANSI T1.404 (DS3)
- ITU-T G.957
- ITU-T G.825
- ITU-T G.824
- ITU-T G.823
- ITU-T G.813
- ITU-T G.707
- ITU-T G.703

Environmental

- ETS 300 019-1-1, Storage Tests, Class 1.2
- ETS 300 019-1-2, Transportation Tests, Class 2.3
- ETS 300 019-1-3, Operational Tests, Class 3.2
- ETS 300 019-2-4, pr A 1 Seismic

Electronic equipment directives

- WEEE
- RoHS
- R&TTE
- China-CRoHS

Certifications

- NEBS Level 3:
  - ¬ Telcordia GR-1089 CORE, Issue 4, June 2006
  - ¬ Telcordia GR-63 CORE, Issue 3, March 2006
  - ¬ ATT-TP-76200
- CE

Ordering information

- Part number: 3HE03073AA
- Description: 7750 SR 10 x GigE HS-MDA
- Interface type: Pluggable SFP-LC

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